GUNDERSEN/LUTHERAN ULTRASOUND DEPARTMENT POLICY AND PROCEDURE MANUAL

SUBJECT: Upper Extremity Venous Ultrasound
SECTION: Vascular Ultrasound
ORIGINATOR: Kraig Schuster BS, RDMS, RVT
DATE: September 16, 2014

APPROVED BY: _____
Jody Riherd MD

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Scheduling: One every 45 minutes.

Prep: None.

Patient Position: Supine with the imaged arm positioned along the patient's side. The arm is then abducted for the Axillary and Brachial veins.

Equipment: Colorflow duplex ultrasound unit with 5.0 MHz and 7 MHz linear array transducers.

***Procedure should be performed at the lowest possible power settings.

Objective: Evaluation of the Upper extremity for DVT.

Exam Protocol: The upper extremity venous ultrasound exam consists of gray scale compression imaging and spectral Doppler waveform analysis. Transverse probe compression can be used on the veins of the arm, jugular, and the distal Axillary vein. Due to the location of the Innominate, Subclavian, and proximal Axillary veins to the clavicle and sternum, Doppler signal and colorflow imaging must be relied on. Bilateral upper extremities should be examined unless symptoms are unilateral. Unilateral exams will include evaluation of the contralateral subclavian vein.

Internal Jugular vein (IJ): The internal jugular vein is identified in the neck in the longitudinal projection. Spectral Doppler is taken documenting direction and waveform pattern. The IJ is then examined with transverse probe compression.

Innominate (INV) and Subclavian Vein (SCV): The INV and SCV are both imaged in the supraclavicular approach with analysis of spectral and color Doppler characteristics. Doppler characteristics of bilateral INV and SCV are compared in all upper extremity venous u/s exams including unilateral exams. A normal Doppler signal should demonstrate both respiratory variation and cardiac pulsations. The Doppler signal should

be nearly identical on each side. Due to the INV and SCV location, compression cannot be used.

Axillary (AV) and Brachial (BV) Veins: The AV and BV are imaged in an infraclavicular approach. The distal AV and BV are imaged with the patients arm abducted. A spectral and color Doppler signal analysis is performed on bilateral AV's in all exams including unilateral studies. A normal Doppler signal should demonstrate both respiratory variation and cardiac pulsations. The Doppler signal should benearly identical on each side. Transverse probe compression is used on the distal AV and the entire BV's. Due to the location of the proximal axillary vein compression may not be possible. The BV is frequently duplicated and should be imaged to the elbow.

Cephalic Vein (CV): The CV is a superficial vein and is imaged in an infraclavicular approach. The CV enters the medial portion of the AV. The CV is examined with transverse probe compression from its medial extent, over the deltoid muscle, down to the elbow. The CV is best imaged with very light transducer pressure due to its superficial location.

Basilic Vein (BasV): The BasV is a superficial vein and bifurcates from the AV near the Axillary area. The BasV is followed from the junction to the elbow with transverse probe compression. The BasV is best imaged with very light transducer pressure due to its superficial location.

Forearm Veins: If the clinical suspicion of DVT warrants, the forearm may be imaged. The patient's arm should be returned to rest at their side. The Radial and Ulnar veins may be imaged with longitudinal colorflow and transverse probe compression. These veins are usually duplicated and can usually be imaged to the wrist.

Imaging Protocol:

Additional images may be necessary to adequately demonstrate anatomy and pathology.

Unilateral:

- *Transverse compression/noncompression of the internal jugular vein.
- *Transverse compression/noncompression of the distal axillary vein.
- *Transverse compression/noncompression of the brachial veins.
- *Transverse compression/noncompression of the basilic vein.
- *Transverse compression/noncompression of the cephalic vein.
- Internal Jugular with colorflow and spectral Doppler.
- Innominate vein with colorflow and spectral Doppler.
- Subclavian vein with colorflow and angle-corrected spectral Doppler.
- Proximal Axillary vein with colorflow and spectral Doppler.
- Cephalic vein at the junction of the Axillary/Subclavian vein with colorflow.
- Basilic vein the junction of the Axillary vein with colorflow.
- Proximal Brachial vein with colorflow.

- Distal Brachial vein with colorflow.
- Contralateral Subclavian vein with colorflow and angle-corrected spectral Doppler.
- *Note should be made that the compression images of each vessel may be taken adjacent to the color/spectral Doppler images of each vessel.

Bilateral:

- Identical to the unilateral exam, with all images taken for both sides, RT side first, then LT side.

References:

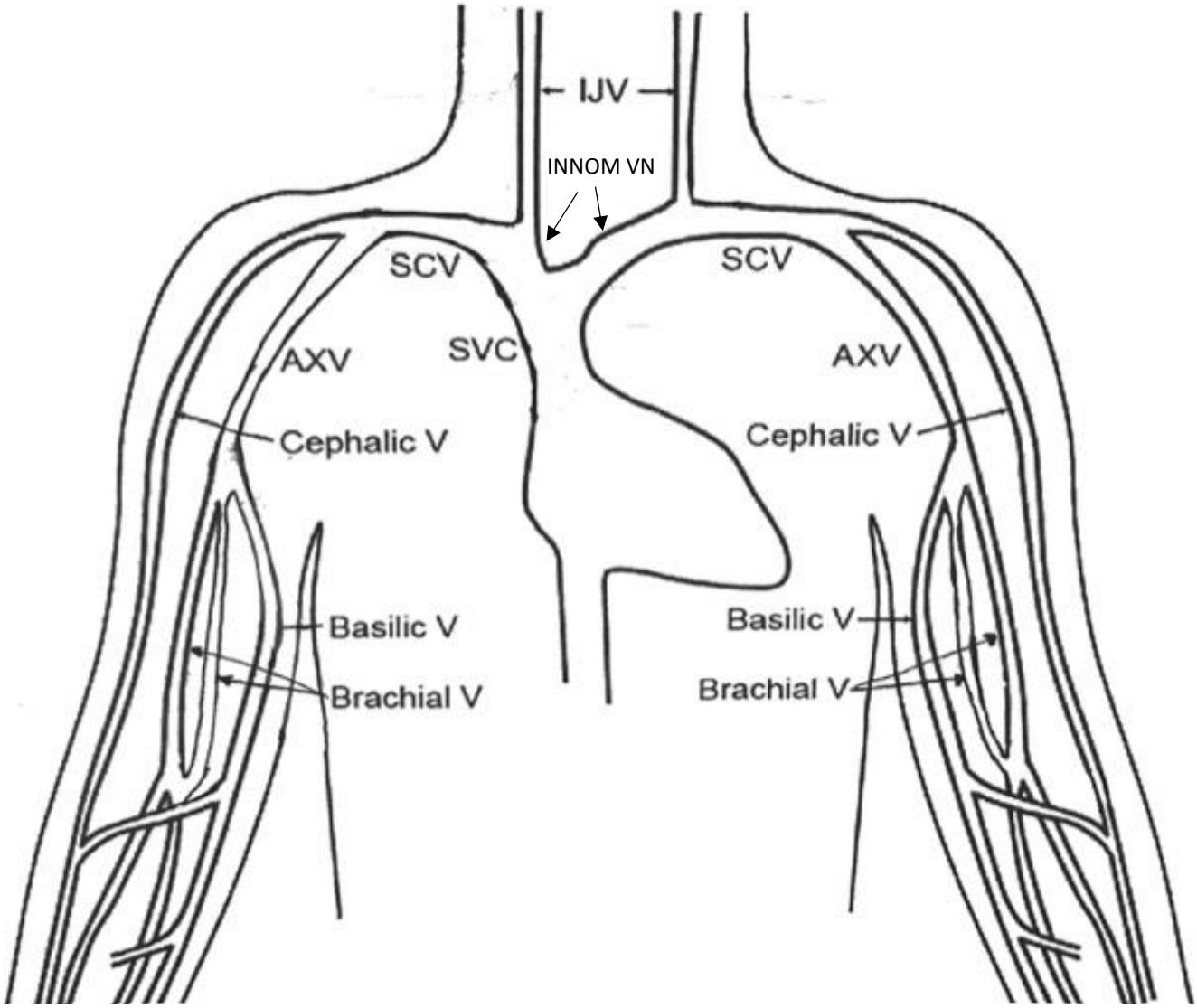
1. Daigle R: Upper Extremity Venous Imaging. In Program Supplement US: The Basics in Vascular Ultrasound July 31 and August 19, 1997 pp24-33. TIP-TV 1997, General Electric Company.
2. Cronan JJ: Venous Thromboembolic Disease: The Role of US. RAD 1993; 186:619-630.
3. Kerr TM, Lutter KS, Moeller DM, ET. Al. Upper Extremity Venous Thrombosis diagnosed by duplex Scanning. Am J Surg 1990; 160:202-206.

Ultrasound of the Thoracic Inlet Veins

Name: _____ Date: _____

Clinic #: _____ Ordering MD: _____

Indication: _____



Compression	Normal	Abnormal
Right		
Left		

Respiratory & Cardiac variation Present? (Yes or No)

	Yes	No
Subclav/Innom V		
Axillary V		

Comments: _____

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Sonographer: _____